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(54) Information handling system

(57) A semaphore 120 for controlling access to a shared resource in an information handling system is implemented using an atomic operation that compares an operand with a comparison value and, if the operand is equal to the comparison value, replaces the compared operand and up to three additional operands with replacement values. The semaphore has a first semaphore field 415 containing a value 435 and a sequence count 430 and a second semaphore field 420 containing a pointer 440 to a queue for the semaphore. The queue has zero or more entries 450 corresponding to waiters for the semaphore, each entry with a next entry having a pointer 455 to that next entry. To implement the semaphore, a previous value of the first semaphore field is saved as a comparison value 1310. A first replacement value 1320 containing an incremented sequence count is generated for the first semaphore field as a first operand in accordance with the specified operation. A second replacement value for the second semaphore field and a third replacement value 1330 for one of the queue entries are generated as second and third operands if the queue is being modified. The current value of the first semaphore field is thereafter compared with the comparison value including the sequence count to see if the current value matches the comparison value. If it does, then, atomically with the comparing step, the first operand is replaced with the first replacement value and, if the queue is being modified, one or both of the second and third operands are replaced with their corresponding replacement values. If the current value of

the first semaphore field does not match the comparison value, the semaphore operation is retried, using a newly saved value of the semaphore field as a comparison value.

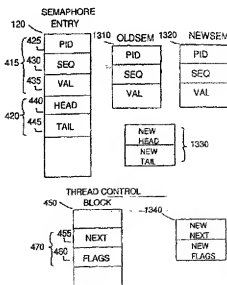


FIG 13

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EUROPEAN SEARCH REPORT

Application Number
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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (ECLA)
X	MELLOR-CRUMMEY J M ET AL: "ALGORITHMS FOR SCALABLE SYNCHRONIZATION ON SHARED-MEMORY MULTIPROCESSORS" ACM TRANSACTIONS ON COMPUTER SYSTEMS, ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, US, vol. 9, no. 1, 1 February 1991 (1991-02-01), pages 21-65, XP000240573 ISSN: 0734-2071	9, 10, 13-16, 18	G06F9/46
Y	* abstract * * page 30, line 1 - line 24; figure 6 * * page 29, line 16 - line 20; figures 5, 6 *	1, 19, 20	
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Y	* page 689, left-hand column, line 8 - line 20 *	1, 19, 20	TECHNICAL FIELDS SEARCHED (ECLA) G06F
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		15 January 2004	Wierzejewski, P
CATEGORY OF CITED DOCUMENTS			
<p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : immediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date O : document cited in the application L : document cited for other reasons S : member of the same patent family, corresponding document</p>			

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X	BOHANNON P ET AL: "Recoverable user-level mutual exclusion" PARALLEL AND DISTRIBUTED PROCESSING, 1995, PROCEEDINGS, SEVENTH IEEE SYMPOSIUM ON SAN ANTONIO, TX, USA 25-28 OCT. 1995, LOS ALAMITOS, CA, USA, IEEE COMPUT. SOC, US, 25 October 1995 (1995-10-25), pages 293-301, XP010196214 ISBN: 0-8186-7195-5 * the whole document *	1
A	"MICROKERNEL SEMAPHORES" IBM TECHNICAL DISCLOSURE BULLETIN, IBM CORP. NEW YORK, US, vol. 38, no. 7, 1 July 1995 (1995-07-01), pages 111-117, XP000521625 ISSN: 0018-8689 * the whole document *	1-20
A	"SEMAPHORE ARCHITECTURE FOR MULTI-THREADED MULTI-MASKING OPERATING SYSTEMS" IBM TECHNICAL DISCLOSURE BULLETIN, IBM CORP. NEW YORK, US, vol. 34, no. 4B, 1 September 1991 (1991-09-01), pages 246-257, XP000189476 ISSN: 0018-8689 * the whole document *	1-20
		TECHNICAL FIELDS SEARCHED (Int.Cl.6)
The present search report has been drawn up for all claims		
Place of search	Date of completion of the search	Examiner
THE HAGUE	15 January 2004	Wierzejewski, P
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DOCUMENTS CONSIDERED TO BE RELEVANT

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A	<p>ANONYMOUS: "Data Structure Scheme to Support Emulation of UNIX Semaphores in the OS/2 Operating System"</p> <p>IBM TECHNICAL DISCLOSURE BULLETIN, vol. 37, no. 1, 1 January 1994 (1994-01-01), pages 417-418, XP002266961</p> <p>New York, US</p> <p>* the whole document *</p> <p>-----</p>	1-20	
			TECHNICAL FIELDS SEARCHED (InCLCs)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 15 January 2004	Examiner Wierzejewski, P
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